



The Energy Story

Chapter 11: Electricity Transmission System

After electricity is produced at power plants it has to get to the customers that use the electricity. Our state and country are criss-crossed with power lines that carry the electricity.

As generators spin, they produce electricity with a voltage of about 25,000 volts. A volt is a measurement of electromotive force in electricity. This is the electric force that pushes electrons around a circuit. "Volt" is named after Alessandro Volta, an Italian physicist who invented the first battery. The electricity first goes to a transformer at the power plant that boosts the voltage up to 400,000 volts. When electricity travels long distances it is better to have it at higher voltages.

Another way of saying this is that electricity can be transferred more efficiently at high voltages.

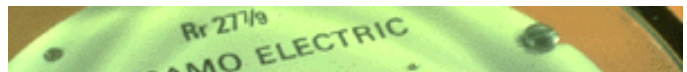
The long thick cables of transmission lines are made of copper or aluminum because they have a low resistance. You'll remember from Chapter 2 that the higher the resistance of a wire, the warmer it gets. So, some of the electrical energy is lost because it is changed into heat energy. High voltage transmission lines carry electricity long distances to a substation.

The power lines go into substations near businesses, factories and homes. Here transformers change the very high voltage electricity back into lower voltage electricity.

From these substations (like in the photo to the right), electricity in different power levels is used to run factories, streetcars and mass transit, light streetlights and stop lights, and is sent to your neighborhood.

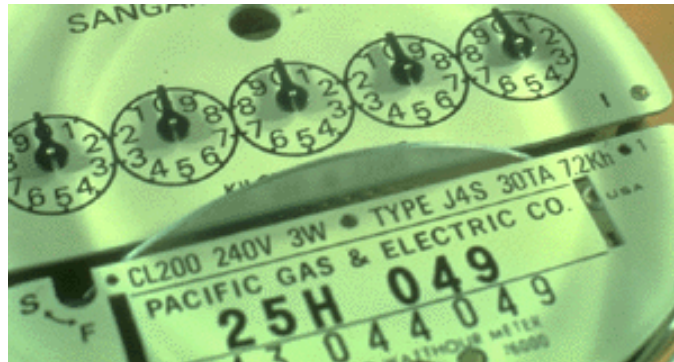
In your neighborhood, another small transformer mounted on pole or in a utility box converts the power to even lower levels to be used in your house. The voltage is eventually reduced to 220 volts for larger appliances, like stoves and clothes dryers, and 110 volts for lights, TVs and other smaller appliances.

Rather than over head lines, many new distribution lines are underground. When electricity enters your home, it



must pass through a meter. A utility company worker reads the meter so the company will know how much electricity you used and can bill you for the cost.

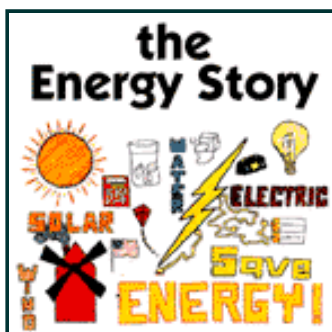
After being metered, the electricity goes through a fuse box into your home. The fuse box protects the house in case of problems. When a fuse (or a circuit breaker) "blows" or "trips" something is wrong with an appliance or something was short-circuited. You should never touch live wires in your house. You should only let an electrician who knows electricity safety work on the wires.



Here's What We Learned

1. Electricity from power plants is sent through a transformer and boosted to a very high voltage.
2. The high voltage power lines carry electricity into cities and towns to substations and to transformers that reduce the voltage.
3. That lower voltage power then goes to a smaller transformer near our homes where power is reduced further. The lines can go underground into our houses.
4. At our homes, the power goes through a meter so the electricity company can bill us for the power that we buy from them.
5. You should never touch live electrical wires. Wires can cause shocks which may injure or even kill you!

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